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the CAT is on the move

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Janet Barr, Editor

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REORGANIZING TO IMPROVE SERVICES

In the February issue of COMPUTERNEWS, we outlined our plans to restructure the UTCS organization to improve our ability to provide computing services within the university community.

The old Services Group and the old Information Systems Group have been expanded and reorganized into three new groups, each with its own manager. As well, the Faculty Liaison Officer has now been appointed by a Search Committee of Senior Academic users.

I am pleased to announce the following UTCS management appointments:

Ralph Lombardi - Manager, Academic Computing Services
Walter Berndl - Manager, Administrative Computing Services
Don Gibson - Manager, Services Support
Frank Spitzer - Faculty Liaison Officer

Ralph Lombardi joined UTCS in 1973 as a terminal co-ordinator at Scarborough College. Ralph then joined the Marketing group, working as a computer services marketing representative. Prior to his recent promotion, Ralph was the Supervisor of the Computing Co-ordinators. As the Academic Computing Services Manager, Ralph will be responsible for planning and co-ordinating the activities of the Computing Co-ordinators. As part of UTCS's reorganization, the role of the Computing Co-ordinators is being redefined; that is, their duties are being modified and expanded. To more accurately reflect the new role of the Co-ordinators, the title "Computing Co-ordinator" has been changed to "Computing Services Representative". Each Computing Service Representative will be responsible for ensuring that the computing needs of the Academic users in his/her area are identified and are met. This means that the Computing Services Representative will become increasingly aware of the computing requirements of UTCS's user community and will deal with these needs on an individual and departmental basis. Conversely, our users will deal with only one person within UTCS which will help to ensure that users' problems are followed-up and resolved satisfactorily.

In 1975, Walter Berndl joined UTCS as a systems programmer. Shortly afterwards, Walter was promoted to the position of Supervisor of the Systems Assurance Group. Walter, as Manager of Administrative Computing Services, will be responsible for looking after all the needs of the Administrative user community which uses the S/370 3031 services. Included in this group of users are Student Record Services, Business Information Systems, and the users of these two services. As well, Walter will be responsible for Programming Services and the Text and Data Entry groups. To assist him in interfacing with the Administrative users, a Computing Services Representative will be appointed specifically to look after the needs of the S/370 3031 users.

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REORGANIZING TO IMPROVE SERVICES cont'd

Don Gibson joined UTCS in 1970 as an operator. Since then, his various responsibilities have included supervising the Information Services Group, Customer Services, and the Engineering Annex Terminal. Don, as the Services Support Manager, will be responsible for providing support services to all the users of UTCS's services. One of the groups associated with Services Support is the Application Support Group which is responsible for the installation, maintenance, documentation and instructional courses related to the use of our applications packages and programming languages. In addition, the Information and Accounting Services and the Publications Group will continue to report to Don as part of the User Support Services area.

For the past year, Frank Spitzer, while on leave of absence from the Department of Electrical Engineering at McGill, has worked on a part-time basis with UTCS. During this period, Frank has co-ordinated the computer assisted typesetting of the course calendars for our major faculties and colleges. UTCS is pleased that Frank has accepted the position of Faculty Liaison Officer. Frank's duties as Faculty Liaison will include determining and continuously monitoring the needs of the research and academic communities, ascertaining how well these needs are being met by UTCS, and advising on major projects.

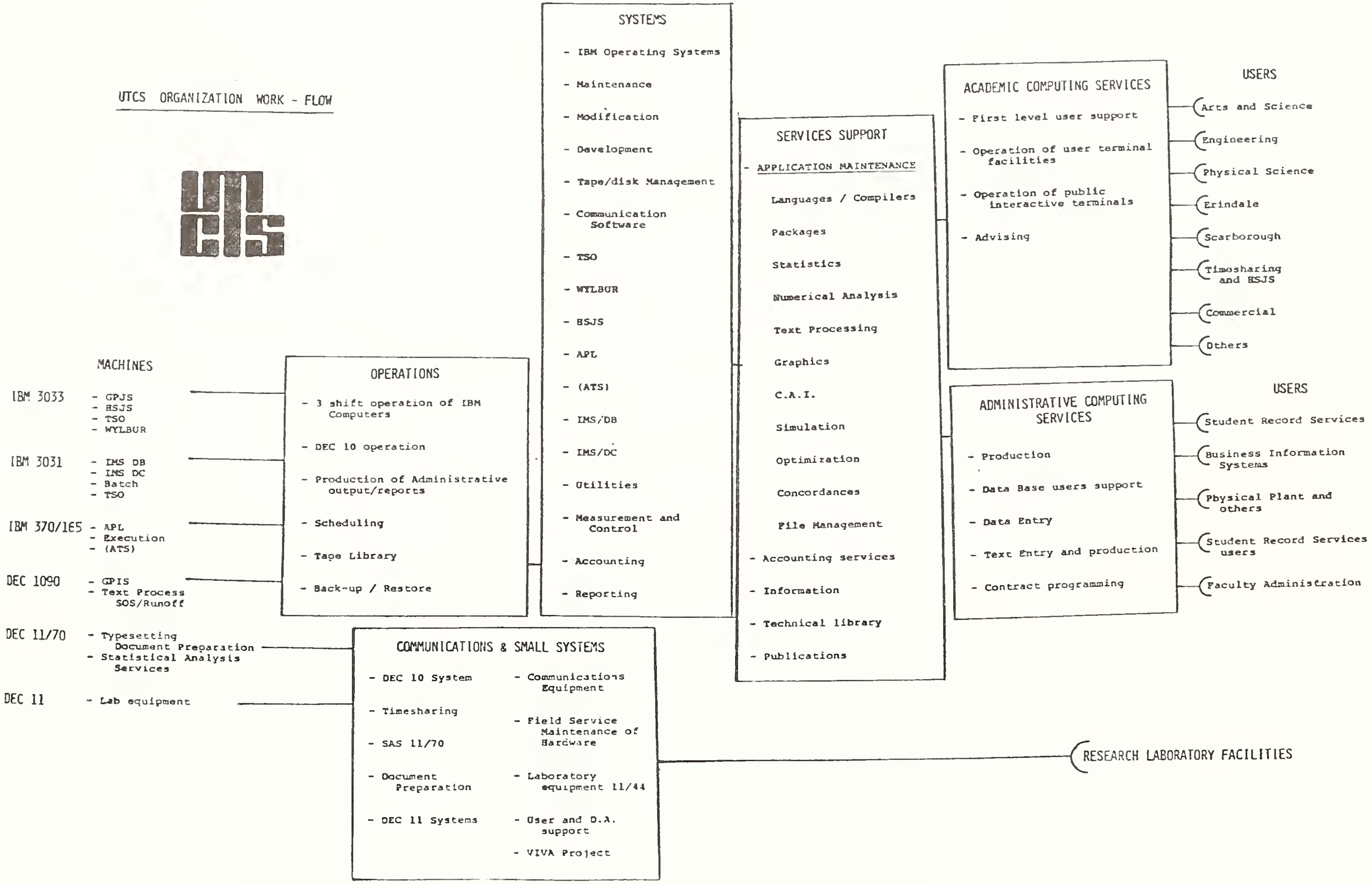
The restructuring of the UTCS organization will improve our ability to meet our users' computing needs.

The reorganization entails some major reassignment, retraining and expansion of responsibilities for our staff. We expect that the new organization will be fully functional for the next academic term which begins in September.

The chart contained on the following page reflects the changes in UTCS's organization.

Rein Mikkor

UTCS ORGANIZATION WORK - FLOW



UTCS'S 2314 DISK DRIVES

The IBM 2314 disk drives are leaving UTCS.

In 1968, when the System/360-65 first became operational on a stand-alone basis, one 2314 pack was available for user rental. Looking like a bank of washing-machines, the 2314 Direct Access Storage Facility housed nine packs, each of which consisted of eleven platters on a common spindle.

Hydraulic pumps moved the heads, similar to the ones in a tape recorder, to record and read concentric tracks. The 2314 could transfer the equivalent of 1000 cards of information in just over a quarter of a second and had a total capacity of about 350,000 cards.

By the spring of 1970, there were 3 volumes devoted to user datasets. Then, in December of 1972, the first IBM 3330 drives arrived. The 3330s were a new generation of drives.

One of the more important concepts they introduced was Rotational Positional Sensing or RPS for short. RPS allows the hardware in charge of talking to the Input/Output devices to tell the 3330s approximately which 'sector' of the disk surface it needs. The disk can then continue independently and signal back when the correct sector is under the read/write heads. This concept allowed several disk operations to occur at the same time and thereby increased system performance and throughput.

Although the 3330 had a capacity of nearly four times that of the 2314, it could not keep up with user demand. By September of 1973, users had access to six 2314 volumes and six 3330 volumes. Online storage had become so cheap in relation to other computer resources that a conservative estimate at the time predicted we would soon need two additional 3330 drives every four months. By 1978 there were twenty 3330 drives online to the IBM S/370-165-II. The last online 2314 had been removed nearly two years before, during the effort to restore service as quickly as possible in the aftermath of the fire at Sandford Fleming. However, users could still rent entire 2314 packs for themselves.

As part of the move to the IBM 3033 Processor complex in December of last year, all user datasets were transferred from IBM 3330 disk storage units to IBM 3330-1 type disk storage. The move went without a hitch and was transparent to users. The 3330-1s have twice the capacity (and hence are frequently referred to as 'doubles'). Despite the higher capacity, there are already sixteen such online packs on the IBM 3033 Processor and there is every indication that this number will continue to rise.

In the meantime, UTCS has attempted to bridge the gap between old and new for those users who have rented packs. For the past two months, Herb Kugel of the Applications Support Group has been assisting users to move information on their private 2314 packs to 3330

cont'd...

UTCS'S 2314 DISK DRIVES cont'd

packs. Despite continued problems with the IEHMOVE Utility, Herb was finally able to overcome the difficulties.

At the end of this month, the last 2314 drive will be disconnected from the IBM 3033 Processor complex. The 3330s currently available to users interested in renting packs provide four times as much space for the same price. As well, through the RPS feature mentioned above, better performance can be realized by larger jobs.

Early next month, new, high-density 'Winchester' technology disk drives will be put online to the production system. With a data storage capacity over thirteen times that of a 2314, these devices offer High Speed Random Access Storage in line with our users' higher demands. The new drives offer this higher capacity at a higher data transfer rate than ever before, providing better service to the growing university computing community.

Alex Nishri

To improve and maintain existing service levels within a changing university environment is a stated goal of UTCS. Elsewhere in this issue, UTCS has reported on its attempts to improve and economize machine services, its reorganized service structure, and its recognition of special user interest groups. UTCS is now pleased to announce that it is engaged in a project to extend service to the research community.

UTCS in consultation with Prof. J.N.P. Hume, Chairman of the Department of Computer Science, and Prof. E.S. Lee, Chairman of the Computer Systems Research Group, has been negotiating with Dr. Sorel Reisman of IBM Canada in order to establish a lecture series aimed at U of T's research community. In his role as Industry Representative for Education and Research, it is one of Dr. Reisman's responsibilities to make the research activities of IBM known to organizations such as universities which share common research interests.

Initially, the lecture series, entitled "Perspectives for Research in Computing", will consist of two lectures to be held in mid-May. Based on the acceptance of these lectures, there will be a more extensive series in the fall of this year. Following this introduction is detailed information regarding the first two lectures.

PERSPECTIVES FOR RESEARCH IN COMPUTING

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EXTENSIVE RADIATION DATASETS AND THEIR APPLICATIONS IN SOLAR ENERGY AND REMOTE SENSING

2:30 P.M. -- May 10 -- McLennan Labs
Room 102

SPEAKER: Dr. Jitendra V. Dave
IBM Corporation, Palo Alto
Scientific Center

Dr. Dave has also been associated with the National Center for Atmospheric Research in Boulder, Colorado, the Departments of Meteorology at both Imperial College, London, England and the University of California in Los Angeles, California. Dr. Dave's talk will provide information about the extensive datasets of diffuse radiation for several realistic models of the cloud free terrestrial atmosphere. These datasets were obtained from a complete numerical solution of the equation of radiative transfer for plane-parallel models with scattering and absorption. They are capable of providing information about the spectral, directional, altitudinal and solar positional characteristics of the diffuse radiation.

Results will be presented to show application of these datasets in several diverse problems such as the isotropic distribution approximation, photovoltaic harvesting of solar energy, remote sensing of the earth resources, and simulation calorimetric of the earth-atmosphere system.

. coffee will be served afterwards in the main lounge

A SIMPLE APPROACH TO SYSTEM MODELING

2:30 P.M. -- May 17 -- McLennan Labs
Room 102

SPEAKER: Dr. Yonathon Bard
IBM Corporation, Cambridge
Scientific Centre

Dr. Bard was associated with the New York Scientific Center from 1957 to 1969 where he researched computer applications in Chemical Engineering, operations research, and statistics. Dr. Bard has been associated with the Cambridge Scientific Center since 1969. While there, he was involved with various aspects of Computer performance analysis many related to performance measurement and analysis for VM/370. Dr. Bard is also the author of Nonlinear Parameter Estimation, Academic Press, 1974.

The talk will show how a set of simple heuristic rules, based on mean value analysis can be used to synthesize realistic models of complex computer systems. The main topic will be preceded by an overview of activities at the Cambridge Scientific Center, stressing the use of a computer installation as a laboratory for research on performance analysis.

- coffee will be served afterwards in the main lounge

PLANNING FOR THE NEW SHARP APL SERVICE

Since the transfer of APL and ATS Services from the S/360-65 to the S/370-165-II in January, 1979, we have had two months of stable and reliable operation. APL users are finding the new system to be more responsive, effective and time-saving for their problem solving and application needs. Consequently, there has been a significant increase in the use of SHARP APL since the transfer. The new system has immediate benefits for APL users including larger APL workspaces and improved file subsystem and terminal response times. In addition, the new system offers the potential for a long term, reliable, SHARP APL Service and a conservatively estimated two-fold increase in computing capacity with uniformly good response.

The accompanying rate increase is proving equitable as the larger APL workspaces enable users to achieve substantial cost reductions in their APL processing by using larger average APL file component sizes and processing more data incore with less program looping and overlay.

UTCS is planning to make a further, significant upgrade to our SHARP APL processor. The main features of the upgrade are:

1. language compatibility with the current level of IBM VS APL and,
2. quad-name support for the SHARP APL keyword primitives and file functions.

The upgraded SHARP APL processor will be largely (but not entirely) compatible with our current system. However, new operations, systems, accounting and service requirements must be developed, assured and stabilized prior to release of the upgraded system as our production SHARP APL system. Therefore, UTCS is proceeding at a slower and more deliberate pace than earlier anticipated.

The current level of SHARP APL will remain the production system for the remainder of this school term and throughout the summer months. During this time, UTCS will develop a new, test, SHARP APL system incorporating the new features; define the Service requirements (utilities, APL batch and sub-tasking, background APL SORT etc.); assure the Service mechanisms (operations, accounting and system assurance); and prepare to assist users in converting their existing SHARP APL applications to the requirements of the new system.

Users who would like to preview and assess the features of the new level of SHARP APL are invited to get in touch with one of UTCS's Computing Services Representatives or Mark Tapia in the Time-Sharing Advisor's Office.

All UTCS Computing Services Representatives are prepared to discuss the requirements and features of the new SHARP APL system, UTCS-supported user program conversion aids and, have a detailed, UTCS-prepared, APL TECHNICAL NOTE on the problem areas and an overview of the new features and likely areas of APL Service enhancement.

Ernst Goetze

SPECIAL APL TERMINALS

During the last several years, there has been an increasing awareness of the number of areas in which computers can profitably be used. For example, many disciplines are now realizing the potential of an interactive computing system as a teaching aid.

Professor Galvin has realized this potential and put it to practical use in his Management and Accounting Control course (COM224S). Since COM224S is a required course in the Bachelor of Commerce program, a large number of students enroll in the course each year. This year, more than 600 students from the St. George campus and Erindale College enrolled in COM224S. Professor Galvin realized that with the large student enrollment it would be impractical to use a computer assisted instruction package which entailed the learning of a computer language. Rather, the package used would have to be easy to learn, self-documenting, and easy to modify.

A package, TREE, developed on APL by Professor Fertuck satisfied these criteria. Professor Galvin modified this package to fit his specific application and called it CFTREE. The CFTREE computer package was made available to all the students in COM224S to assist them in completing their assignments. The use of the CFTREE package provided students with the opportunity to solve more complex "real world" type problems than would otherwise have been possible. With a few simple commands, the computer was capable of performing linear programming and regression analysis.

The number crunching capability of the computer means that the student spends less time in performing mathematical calculations and devotes more time to interpreting results. In so doing, the student gains a better understanding of the subject matter covered in COM224S.

Professor Galvin felt the major advantage in using this system as a teaching tool was the ability of the student to interact with the system. In a "batch" processing environment, the student is required to learn the Job Control Language (JCL) as well as how to interpret the error messages. With the APL language using the CFTREE package, a student could learn to manipulate the system within 45 minutes. Unlike the "batch" oriented environment, the student is able to obtain immediate feedback from his input command. The system is also "forgiving" in that if a command was mistyped or incorrect, the student is able to make the appropriate changes and continue where he had left off.

Although an interactive system has many advantages as a teaching tool, it does have its disadvantages. Unfortunately, an interactive system places a constraint on the number of people allowed to use the system at any one time. Unlike a "batch" environment, where several users may use one remote job entry terminal (RJE), only one person can use one interactive terminal at any one time. Thus, whether or not an interactive system can be used depends upon the number of interactive terminals available.

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SPECIAL APL TERMINALS cont'd

When Professor Galvin first approached UTCS with his proposal to use APL as a teaching tool for his course, concern was raised over the number of public terminals available for his students. With an enrollment of 600+ students in the course, UTCS realized that Professor Galvin would need more interactive terminals for his students than were publicly available. Unfortunately, UTCS had no space available to accommodate the additional interactive terminals required to meet the demands of Professor Galvin's students. In an attempt to respond to Professor Galvin's need for more terminals, UTCS agreed to furnish his students with an additional six terminals if Professor Galvin was able to find suitable space.

In mid-February, Professor Galvin informed UTCS that space had been found for the terminals. By the week of February 27th, UTCS had installed six DECwriters with APL character sets, and the accompanying accoustic couplers. UTCS also made arrangements with Bell Telephone to install six terminal telephones. In early March, Professor Galvin had an additional six interactive terminals for his students to use. This first attempt to use the computer as a teaching tool for COM224S was a success. Given the opportunity, Professor Galvin would not hesitate to use this system again.

Professor Galvin was pleased with the results and would highly recommend this system as a teaching aid. In Professor Galvin's opinion, the CFTREE package provides students with the opportunity to solve problems of a practical nature and results in a better understanding of course material.

Sue Chong

DECSYSTEM-10 NEWS

The DEC 10 support group has been very active during the last few months. A number of projects have recently been completed and several others will be implemented in the very near future. This article will describe some of this work.

Disk Upgrade

The most visible recent change related to the DEC 1090 was the installation of the new RP06 disk drive and RH20 channel/controller. The disk space made available by this upgrade allowed us to reorganize the public file structures by moving files belonging to UTCS internal staff to DSKC. This eased the pressure on DSKB which now contains only system files and those belonging to UTCS's paying customers.

The final phase of the disk expansion program will occur at the end of May when Digital delivers three additional RP06 drives to replace the four RP04s which came with the original system. The end result will be a doubling of the disk space available to our users.

cont'd...

DECSYSTEM-10 NEWS cont'd

An additional benefit of this hardware upgrade is the new RH20 disk channel/controller. This extra data path should improve system performance by relieving the bottleneck caused by using the same channel for all swapping and disk I/O.

New Monitor

On March 5, a pre-release version of Digital's new 6.03A monitor (known as 6.03A-P) was installed. The improved reliability of this operating system was not immediately apparent due to a series of hardware problems. However, in the month and a half since installation, there have been only two system crashes which were unambiguously due to software problems.

The official release of the 6.03A monitor will be installed in the near future, possibly by the time this article is published. Except for a few additional bug fixes, 6.03A will be identical to 6.03A-P.

IBM Link

One of the most popular features of the UTCS DECsystem-1090 is the IBM remote job entry facility. It was also the most frustrating feature for both users and operating staff alike due to the high frequency with which the link died.

After several months of studying these problems, three specific bugs were identified and solved with the DN61 software. (The DN61 is the PDP-11/40 front end which emulates an IBM 3780.) We now expect the IBM link to be very stable and reliable.

"CPU Runtime Anomaly"

On May 1, a change to the monitor corrected an outstanding problem with the calculation of a job's CPU runtime and memory usage. This necessitated a simultaneous change to the rate schedule so that the charge for a specific task remained unchanged. This problem and its solution are described in detail in the November '78 issue of COMPUTERNEWS.

Future Plans

Many users are already aware that UTCS is developing a Document Preparation Service (DPS) for the production of print quality masters for a variety of types of documents. The DEC 10 is involved in this project to the extent that its text editors will be used to prepare the input data files for the PDP-11/70 based typesetting system and, on the user's command, to spool the files to the 11/70 for processing (refer to the article entitled DEC USER FORUM in the March issue of COMPUTERNEWS).

At present, work on a simple spooler for use in the immediate future is nearing completion. In the long run an expanded spooler will be integrated into the GALAXY system to allow the use of all the facilities which are now available using QUEUE (see the QUEUE Help file).

On-Line Accounting

One of the subjects raised at the DEC User Forum on March 28 was the online charging and balance reporting facility. In particular, users wanted non-session charge items to be debited from their balance and reported to them at their next LOGIN.

cont'd...

DECSYSTEM-10 NEWS cont'd

This facility is now being developed and is expected to be working by about the end of June.

Summary

This article has described the recent efforts and present plans of the DEC 10 support group. Users who would like to suggest new projects or express their opinions about what we have done in the past are encouraged to submit their comments using the GRIPE procedure or by calling Mark Tapia at 978-7109.

Edmund West

POLICY ON DEC 10 GAMES

Many of the users who participated in the DEC forum held on March 28 objected to the fact that computer games are available on the DEC 1090. Because some games (particularly ADVENTURE and DUNGEON) are both large and popular, the increased swapping which results when several users play games at the same time can cause system response to be significantly degraded.

In order to protect its customers from interference of this type, UTCS has established a new policy whereby internal staff have been requested not to play games during lunch hours and breaks which occur during prime time. Paying customers, of course, will still be allowed to execute any program they choose at any time. However, if an account holder wishes to disallow access to the games for his PPNs, he should give the necessary information to the accounting office.

Edmund West

CLASS E NEWS

Class E was described in a presentation given to twenty-two people at the end of April. Copies of the Class E rate schedule and the draft Class E documentation were distributed at this meeting. Anyone planning to use the Class E service can obtain these items from a Computing Services Representative or the UTCS Information Office.

To use Class E, one must have a valid S/370 Service Access Code (SAC). Additionally, this SAC must be enabled by the UTCS Accounting Office for use on Class E. To accomplish this, a user must supply a letter from the person holding the Customer Account Number (CAN) responsible for the code requesting that the code be authorized by Class E use.

Any problems or questions regarding Class E can be directed to Bob Chambers, Room 1202 of the Burton Tower (phone: 978-8823).

Bob Chambers

MATH SOFTWARE UPGRADE TO 3330

Source code and machine readable documentation for several of the mathematical packages available on the 3033 are currently stored on an offline 2314 disk pack. UTCS is in the process of phasing out its 2314 disk packs in favour of the newer 3330 models (see article entitled UTCS'S 2314 DISK DRIVES in this issue of COMPUTERNEWS). As of June 1, the source code and machine readable documentation (if available) for the routines in EISPACK, ENGLIB, LINPACK, MATHLIB, OPTISEP and QMS along with the Application Program Index will be stored on an offline 3330 disk pack.

The modules associated with USERBOOK section 3.7 Application Software which describe these packages will shortly be updated to reflect this change. In the meantime, users of this offline material should note that the only change to the current USERBOOK sections involves the procedures APPLINDX and RETRIEVE. When using these procedures to access information pertaining to the above-mentioned software, the statement

```
/*SETUP  UNIT=2314
```

should be replaced by the statement

```
/*SETUP  UNIT=3330
```

Any questions relating to this modification should be addressed to Bob Chambers, Room 1202 of the Burton Tower (phone: 978-8823).

Bob Chambers

UNIX USERS GROUP CONFERENCE

The UNIX Users Group Conference will be held at the University of Toronto, from Wednesday, June 20, 1979, through Saturday, June 23, 1979. The June '79 conference activities will include a software exchange facility for 800/1600 9-track tapes and RK05 disks, and the first annual UNIX computer Reversi tournament. As well, program sessions may include:

New or improved UNIX
Interfacing with other Operating Systems
USENIX business meeting
Secure UNIX
PWB
Mini-UNIX and Micro-UNIX
Languages
Communications -- Networking
Data Base Management Systems
Text Processing
Educational uses
Games
Vendors Session, books and publications
Real-Time Applications
Graphics

Registration for the conference will take place on Tuesday, June 19, 1979, from 7p.m. - 9p.m. The registration fee will be $15.00 for those who pre-register and $20.00 for those who register at the conference (for students, the fee is $5.00 for those who pre-register and $10.00 for those who register at the conference).

Registration forms and further information concerning the UNIX Users Group Conference can be obtained by contacting:

Rosanna Reid
UNIX Users Group Conference
Computer Systems Research Group
121 Saint Joseph Street, Room 311
University of Toronto
Toronto, Canada
M5S 1A1
(416) 978-6323

THE 10TH OUCC

From June 6 to June 8, 1979, the University of Ottawa will be hosting the 10th Ontario Universities Computing Conference. The theme of the 10th OUCC is "changing patterns in computing at universities and colleges" (refer to the article entitled THE 10TH ONTARIO UNIVERSITIES COMPUTING CONFERENCE in the November '78 issue of COMPUTERNEWS).

The preliminary agenda for the conference is presently available and a copy has been posted in the Information Office, Room 206, Engineering Annex.

PERSONNEL CHANGES

Chiu Kwong is a new Engineering Technologist in the Communications and Small Systems Group. Chiu came to UTCS from Physics, and will be maintaining communications and terminals here.

Stephen Pascoe is another new Engineering Technologist who will be concentrating mainly on PDP-11 systems. Stephen comes to us from DEC in Ottawa.

Ron Vander Kraats started as the Supervisor of hardware development in the Communications and Small Systems Group on April 9. Before coming to UTCS, Ron worked at IBM and Princeton.

Joyce Larcher is the new Accounting Supervisor in the Management Office. She will be in charge of accounts payable and the Budget Control System (BUCS). Her last job was with Alumni Affairs at U of T.

Clara Pereira

UTCS SYSTEMS

3033 PROCESSOR

- located in McLennan Physical Laboratories
- provides General Purpose Job Stream, High Speed Job Stream, TSO, WYLBUR
- 6 megabytes of memory
- MVS with JES2

SYSTEM/370 MODEL 165-II

- located in McLennan Physical Laboratories
- provides APL and ATS services
- 4 megabytes of memory
- OS/MVT with APL and ATS

3031 PROCESSOR

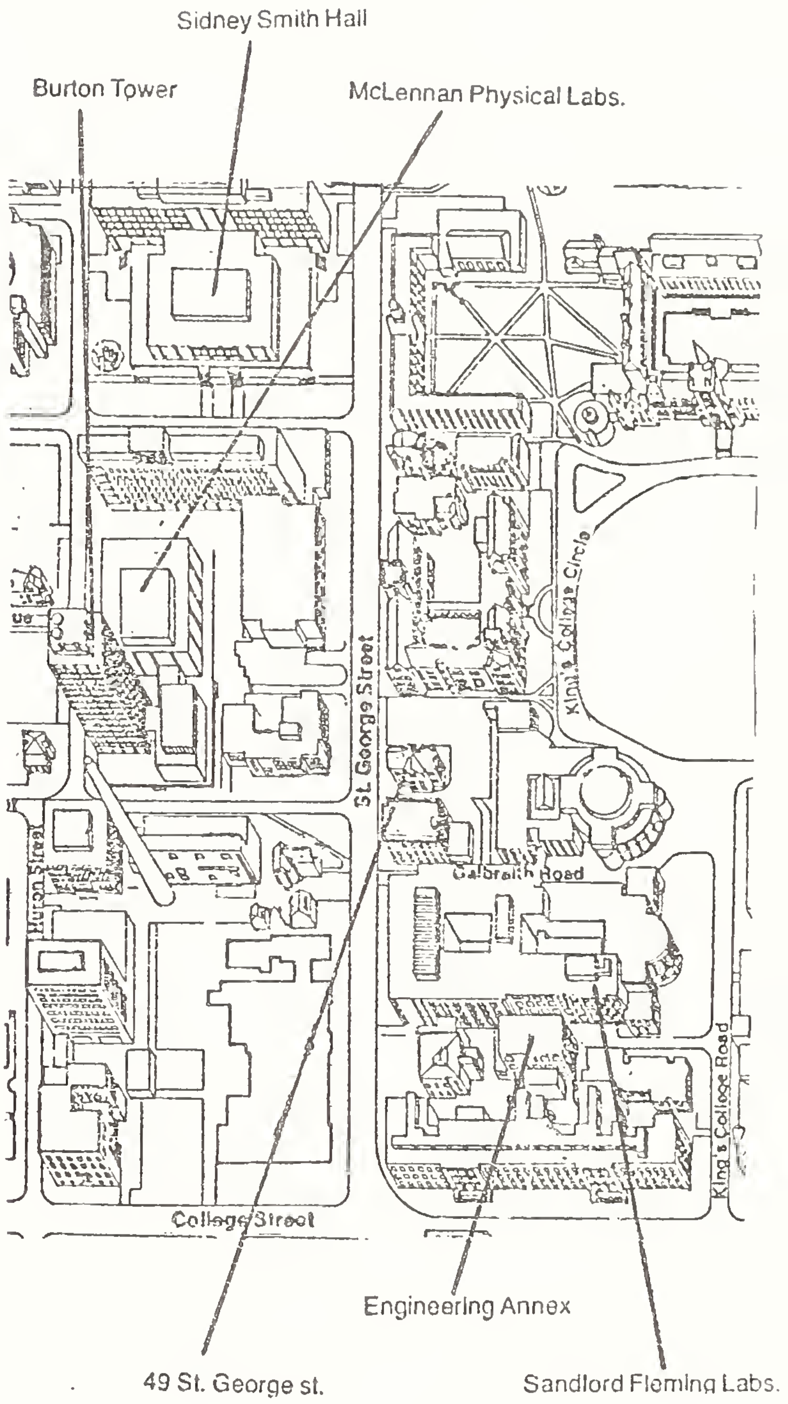
- located in McLennan Physical Laboratories
- provides administrative IMS/VS DB/DC Batch and TSO services
- 6 megabytes of memory
- MVS with JES2

DECSYSTEM 1090

- provides General Purpose Time-Sharing
- 256k - 36 bit words of memory
- TOPS10 operating system

COMMUNICATIONS & SMALL SYSTEMS

- located in SF207/SF109/112
- DEC GT44 System with PDP-11/40 CPU
- DEC GT40 System with PDP-11/05 CPU
- provides specialized graphics and interactive graphics
- provides on-line and real-time computing services, data acquisition and minicomputer services



UTCS DIRECTORY

POSITION	ROOM	CENTREX PHONE NUMBER
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Dr. Doron Cohen	ML350	8948
ASSOCIATE DIRECTORS		
Rein Mikkor	ML350	5058
Al Heyworth	ML350	4936
FACULTY LIAISON OFFICER		
Frank Spitzer	ML350	4619
MANAGER, COMMUNICATIONS AND SMALL SYSTEMS		
Eugene Siciunas	ML350	4967
MANAGER, OPERATIONS		
Derry Cox	ML350	7092
MANAGER, SYSTEMS		
Sean Keeley	ML350	3579
MANAGER, ACADEMIC SERVICES		
Ralph Lombardi	ML350	7130
MANAGER, ADMINISTRATIVE AND PROGRAMMING SERVICES		
Walter Berndl	ML350	7331
MANAGER, SERVICES SUPPORT		
Don Gibson	ML350	5568
INFORMATION & ACCOUNTING OFFICE		
General Inquiries	EA206	4990
Marg Doherty	EA206	3960
ACCOUNTS		
Merton Hunte	EA206	8702
Sylvia May	EA206	7148
ACCESS CODES		
Agatha Stevens	EA206	8703
SUPERVISOR, APPLICATIONS		
Herb Kugel	SG304	7286

COMPUTING SERVICES REPRESENTATIVES

Engineering Annex Terminal		
Jill Reece	EA103A	4357
Program Advisors	EA103	
Time-Sharing Support		
TS Advisors	SG204	6465
Mark Tapia	SG204	7109
Erindale		
Paul Shindman		828-5311
Scarborough		
Ihor Prociuk		284-3173
Arts and Science		
Sue Chong	SS2133	6509
New Physics		
Bob Chambers	ML1202	8823

SUPERVISORS, OPERATIONS

Paul Scarborough(IBM 3033)	ML335	6220
(IBM 165 & DEC 1090)	ML335	7374
Dave Wong (IBM 3031)	ML335	6864

KEY:

EA = Engineering Annex
SG = 49 St. George
ML = McLennan Physical Laboratories (New Physics)
SF = Sandford Fleming
SS = Sydney Smith

JOB AND SYSTEM STATUS QUERIES

SYSTEM/3033,TSO	7373
ATS/APL	6234
2741 TERMINAL MALFUNCTIONS	7107

TIME-SHARING SERVICES	DIAL-UP
APL,ATS	7200 CENTREX 7201 NON CENTREX
TSO,WYLBUR	6200 CENTREX 6201 NON CENTREX
DEC 10 SERVICES	4224 CENTREX 4244 NON CENTREX
PHONE-IN ADVISING	6465

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Computing Services
Toronto, Canada

CAMPUS DELIVERY

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SERIALS DEPARTMENT
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UNIVERSITY OF TORONTO